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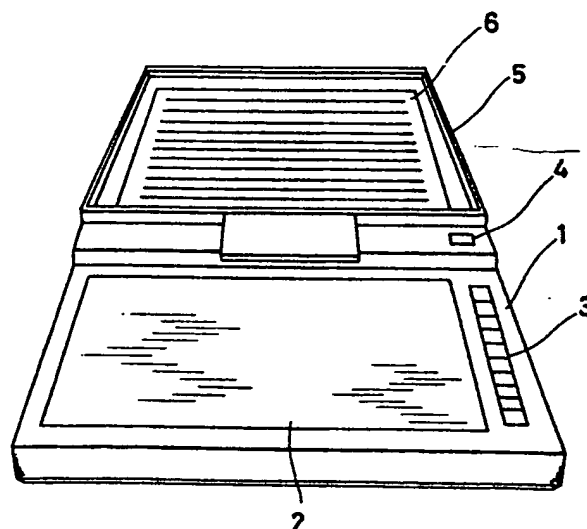
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54 **Paperless portable book.**

57 A paperless portable electronic book is disclosed which is adapted for use with interchangeable magnetic floppy discs, optical discs or the like and comprises a reproducing device for reading information from the floppy disc, a display and a battery. Preferentially, the display is a liquid crystal display and the battery is an amorphous silicon solar cell.

FIG. 1



PAPERLESS PORTABLE BOOK

BACKGROUND OF THE INVENTION

The present invention relates to a paperless book, and more particularly relates to a paperless book which is in readily transportable form and is compact and convenient for assembly in book collections such as in the home, in schools and colleges, and in libraries.

A vast quantity of printed matter is widely distributed in the form of books. Such printed books generally comprise at least several tens of paper sheets and often several hundreds of paper sheets, and therefore the weight of a book can be quite substantial. Especially in the case of novels and books for professional use, the weight of a copy may exceed 1 Kg. Because of this, books are generally transported by trucks to book shops and other retailers, which increases their cost due to the high transportation cost. Furthermore, books are often somewhat large in size so that a large amount of space has to be provided for storing copies.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a paperless book which is in a form that is convenient for transportation.

It is another object of the invention to provide a paperless book which requires only a small amount of space for its storage.

In order to accomplish the above objects, the invention proposes that an electronic display and an electronic memory are used in place of printed paper to provide a handy device for reading written material.

More particularly, the information consisting of characters such as letters, symbols and the like is converted into digital form. Namely, the information in the form of printed words of a book is converted into a suitably encoded digital form on a memory such as a magnetic floppy disc, an optical disc or other convenient storage device. The paperless book according to the invention is comprised of a reproducing device for use with such a memory and a suitable display. The reader views the display in place of reading the printed paper of a conventional book.

According to a preferred embodiment of the invention which is described hereinafter there is thus provided a portable paperless book comprising, in an integrated unit generally in the shape of a book, a reader for a magnetic floppy disc optical

disc or other interchangeable compact digital storage medium, a processor, an input facility operable to cause said processor to selectively process information retrieved from the digital storage medium, display means for displaying such information, and a solar cell for powering the unit, the unit comprising a body portion and a cover portion hingedly connected thereto and the display means being provided in one of said portions and the solar cell being provided in the other of said portions.

By virtue of the invention, a collection of conventional books can be replaced by one reproducing device as abovementioned and a collection of floppy disc or other compact memories each weighing, for example, only 10g to 30g. Furthermore, only the light weight memories have to be transported to book retailers.

The advantages of the invention become particularly significant if the reproducing devices are standard issue to all members of a particular group. For example, if one reproducing device is provided for each student in a school, the students do not have to bring their heavy books to the school and instead need to carry with them only light weight memories.

Further features of the invention are set forth in the appended claims and will become clear from consideration of the following description of an exemplary embodiment which is shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing an exemplary paperless book in accordance with the invention;

Fig. 2 is a side elevation view showing the paperless book of Fig. 1; and

Fig. 3 is a block diagram of the paperless book of Figs. 1 and 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Figs. 1, 2 and 3, a portable paperless book in accordance with the present invention is illustrated. The book comprises a reproducing device 1 having a display 2, key buttons or other external input facilities 3, an on/off switch 4 operated by opening and closing a hinged lid 6 of the device, a solar cell module 5 for auxiliary energy supply provided on the lid 6, a data file

processor 7, an input terminal 8 for connection of an external electricity supply to the device, and terminals 9 and 10 for inputting data from an external device.

In the illustrated embodiment, the display 2 is a liquid crystal display and the data file processor is a disc drive adapted for use with optical discs on which information is stored in terms of variations in the reflectance of the disc to incident light. A magnetic floppy disc and associated magnetic read heads can be employed in place of the optical disc and its associated reader. Liquid crystal displays are preferred in that they do not over stimulate the eyes, but other display formats can be used. The solar cell 6 may for example be an amorphous silicon semiconductor solar cell of 200 mm length and 300 mm width.

The amorphous silicon solar cell consists of a plurality (e.g. 25) of photoelectric conversion devices connected to each other in series, each conversion device comprising a transparent substrate (such as a glass or plastics plate, or the like), a transparent conductive film of such as indium tin oxide, SnO_2 , ZnO or multiple layers thereof formed on the substrate and constituting a first electrode of the cell, a multi-layered amorphous silicon semiconductor incorporating a PIN junction therein formed for example by a known CVD process, and a second transparent electrode film formed over the semiconductor. The conversion devices may be manufactured by using laser processing techniques scribing the layers deposited on the 200mm x 300mm substrate. By virtue of the transparency of the substrate and the underlying and overlying electrodes, the solar cell can receive sunlight from both sides of the lid so that power generation can continue regardless of whether the lid is open or closed.

The paperless book according to the invention is further provided with a processing unit 11 shown schematically in Fig. 3 and comprising a micro-computer and a memory. By means of this unit, information reproduced by the data file processor 7 may be transmitted to the display 6 in accordance with commands entered by use of the input facilities 3, so that a user can as he desires read from the display screen 2 just as he would read a conventional book. On the display 2, 50 lines of text each accommodating up to 60 characters can for example be displayed and the text displayed on the screen can be changed easily by operating the input facility 3.

In a modification of the above described embodiment a plurality of data pages may be reproduced at a time by the data file processor 7 and temporarily stored in the user memory provided in

the unit 11. By this means a reader can repeatedly call arbitrarily selected pages of text for display on the screen with out delay just as he can during reading of a printed reference.

Furthermore, a matrix array of pressure sensors or photo sensors can be formed on the display so that, by use of touch or of a light pen, a user can designate particular portions of the display information and store corresponding flags in the user memory in the unit 11, for example in order to cause important portions of the display text to be emphasized by underlining or inverted commas.

While the present invention has been described in conjunction with a particular embodiment, it is to be appreciated that the invention is not limited to the described embodiment and that many modifications and variations are possible without departure from the scope of the invention as set forth in the appended claims. For example, the reproducing device of the described paperless book could if desired be provided with a battery for storage of electricity generated by the solar cell. Furthermore, the compact digital storage medium could alternatively be a digital magnetic tape for example or an EPROM or the like. It is further to be appreciated that whilst the paperless book of the invention has been described herein as a replacement for novels and other conventional books having pages of printed text, the book could be adapted to be used as an electronic diary with the facilities 3 enabling the user to make his own entries onto blank "pages" of the diary.

Claims

1. A portable paperless book comprising:
an electronic memory for storing information in encoded form;
a reproducing device for reading information from said memory; and
a display for visualizing said information.

2. A book according to claim 1 wherein said memory is a floppy disc.

3. A book according to claim 1 wherein said memory is an optical disc.

4. A book according to any preceding claim wherein said reproducing device and said display are integrated into a unit.

5. A book according to claim 4 further comprising a solar cell for supplying the power necessary for driving the integrated unit.

6. A book according to claim 5 wherein said solar cell is made of a non-single-crystalline silicon semiconductor material.

7. A book according to claim 5 or 6 wherein said solar cell comprises a transparent substrate, a photoelectric conversion layer, and transparent electrode arrangement for said solar cell.

8. A book according to claim 5 or 6 or 7 wherein said solar cell is provided in the form of a lid for said unit.

9. A book according to claim 8 wherein said solar cell is adapted to receive sun light from both the upper side and the lower side of said lid.

10. A portable paperless book comprising, in an integrated unit generally in the shape of a book, a reader for a magnetic floppy disc optical disc or other interchangeable compact digital storage medium, a processor, an input facility operable to cause said processor to selectively process information retrieved from the digital storage medium, display means for displaying such information, and a solar cell for powering the unit, the unit comprising a body portion and a cover portion hingedly connected thereto and the display means being provided in one of said portions and the solar cell being provided in the other of said portions.

11. A portable information displaying device comprising:

an electronic memory for storing information in encoded form;

a reproducing device for reading information from said memory;

a display for visualizing said information; and a photoelectric conversion device.

FIG. 1

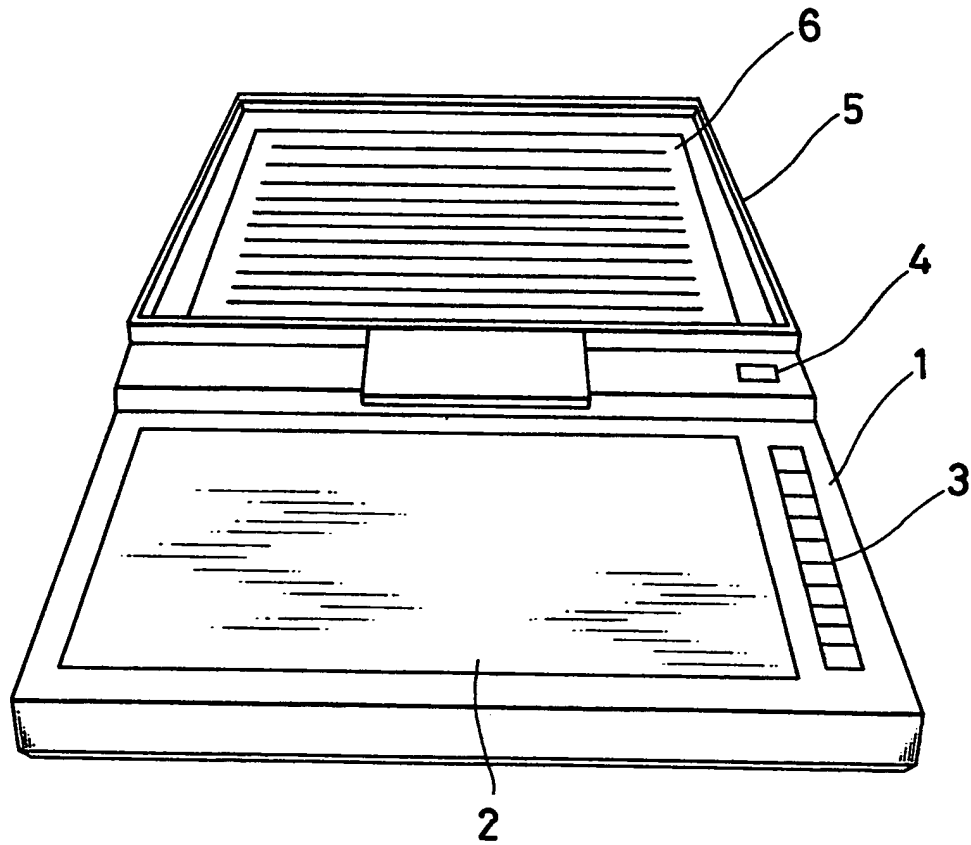


FIG. 2

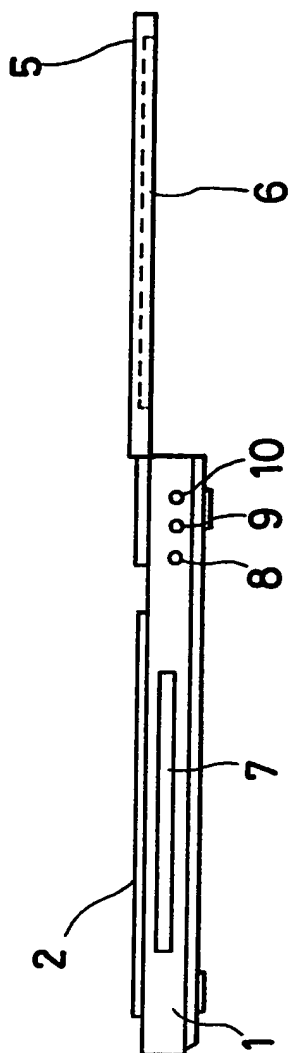
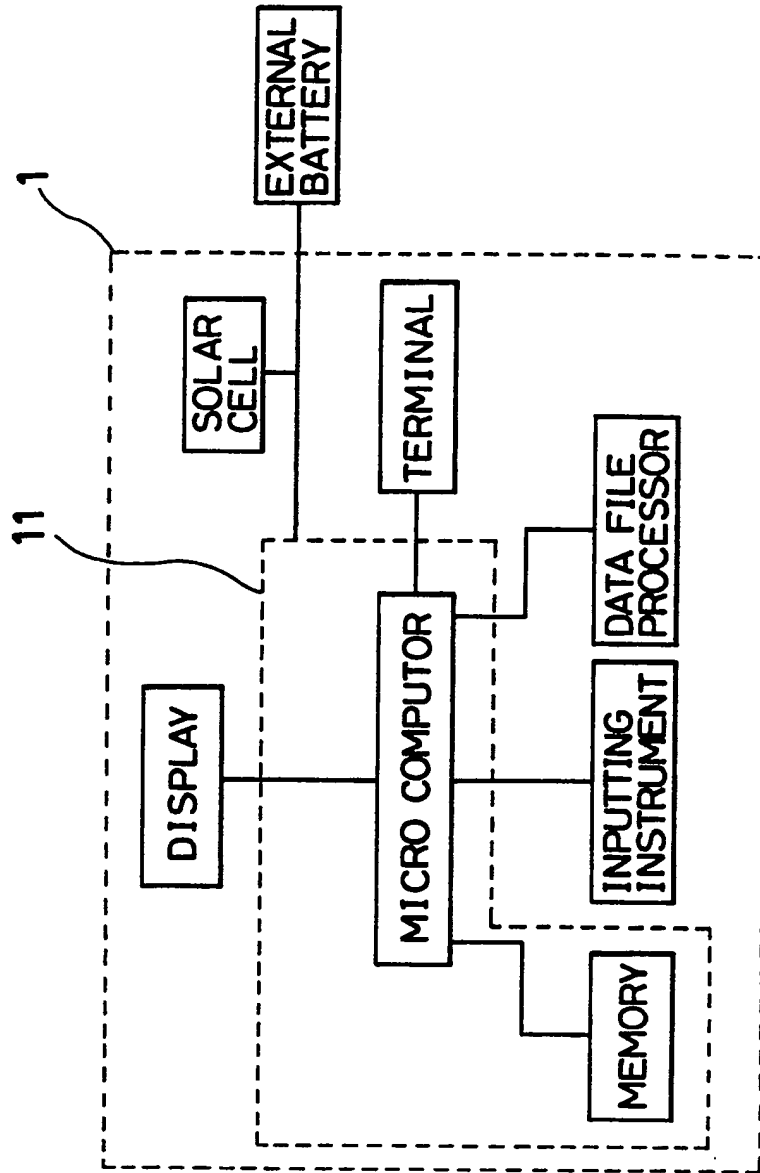


FIG. 3





DOCUMENTS CONSIDERED TO BE RELEVANT			EP 87305595.8
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	EP - A2 - 0 121 251 (AV-HÄHNEL) * Fig. 4; abstract *	1,4,11	G 11 B 33/06 G 11 B 33/12
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A	AT - B - 348 788 (N.V. PHILIPS) * Fig. 1; claims 1-9 *	1,3,11	
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P,A	EP - A1 - 0 198 093 (FANUC) * Fig. 1,2; abstract *	1,2,10, 11	
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A	GB - A - 1 456 293 (YUGEN KAISHA WATANABE KENKYUSHO) * Fig. 1; claims 1-5 *	1,10, 11	
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A	US - A - 4 150 435 (SATO) * Fig. 3; abstract *	1,4,10, 11	TECHNICAL FIELDS SEARCHED (Int. Cl.4) G 11 B 7/00 G 11 B 33/00 G 11 B 31/00 G 11 B 5/00

The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 14-10-1987	Examiner BERGER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons
& : member of the same patent family, corresponding